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(54) **A scheduler apparatus for use in a television receiver**

Vorrichtung zum Programmieren eines Fernsehempfängers

Dispositif programmeur pour un téléviseur

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**EP-A- 0 682 452**  
**US-A- 5 353 121**  
**EP-A- 0 662 769**  
**WO-A-95/01057**

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**EP 0 774 866 B1**

## Description

[0001] The subject invention concerns apparatus for scheduling the selection of a television program for watching or recording at some future date.

[0002] The act of selecting a television program to watch has become more complicated in that the number of available channels has increased dramatically of late. For example RCA® DSS® direct broadcast satellite receivers provide as many as 150 channels to choose from. Heretofore, a user who wanted to see "what's on" could merely consult a television schedule printed in his local newspaper in the hope that he would eventually find a program which sparked his interest.

[0003] Such a practice may work well when there are only a few television channel schedules to examine, however, it is unlikely that a viewer would be able to examine the complete schedules for 150 television channels, just to see "what's on" at a given time. Such a task would be daunting even if all of the programs were to be listed by category. A viewer may find that there are only a few programs of interest to him out of the vast number of available programs. That is, the chaff outnumbers and tends to hide the wheat. Consequently, it is felt that as the number of channels increases, the chances of successfully locating a desirable program in a short time becomes more and more unlikely.

[0004] The document EP 0 572 090 A2 describes a system and a method for automatically correlating user preferences with a television program information database.

[0005] An object of the invention is a method of selecting a television program comprising the steps of

searching a stored program guide for a television program matching data representing characteristics of television programs previously watched by a user;  
upon completion of said searching, notifying said user of an availability of a matched television program

characterized in that it comprises the step of:

storing automatically data representing characteristics of television programs previously watched by a user, said data being capable of being manually changed in response to a user input.

[0006] According to a particular embodiment, the data representing characteristics of television programs may relate to topic, title, date, theme, or frequency of watch information.

[0007] According to a particular embodiment, the program guide comprises television program descriptive text which may relate to title, star, director or context of a television program, and said searching step including a search of said television program descriptive text.

[0008] According to a particular embodiment, the invention further comprises the step of providing a user with the option of recording the matched program.

[0009] According to a particular embodiment, the notifying step includes the step of producing a display of a list of television programs having similar characteristics to a previously watched television program.

[0010] FIGURE 1 is an illustration of a screen display, in accordance with an aspect of the invention.

[0011] FIGURE 2 is an illustration of a screen display showing a viewed item list in accordance with another aspect of the invention.

[0012] FIGURE 3 is a flowchart useful in understanding the invention.

[0013] FIGURE 4 is an illustration in block diagram form of apparatus suitable for use with the invention.

[0014] FIGURE 5 is a flowchart useful in understanding the invention.

[0015] FIGURES 6a-6c are illustrations of screen displays produced in accordance with the invention.

[0016] Television systems such as the RCA® DSS® direct broadcast satellite system and Starsight® transmit channel guides for display on the television receivers of subscribers.

[0017] FIGURE 1 shows a Program Guide screen display 110 produced, for example, by an RCA® DSS® direct broadcast satellite receiver system, manufactured by Thomson Consumer Electronics, Inc. Indianapolis, IN. A user selects a television program from a Program Guide for viewing, by moving a cursor (via operation of remote control up, down, right, and left, direction control keys, not shown) to a block of the program guide screen display which contains the name of the desired program. When a SELECT key of the remote control is pressed, the current x and y position of the cursor is evaluated to derive virtual channel and program time information. In this example of FIGURE 1, a particular television show, CINE SATURDAY NIGHT MOVIE: ZULU has been highlighted for selection by use of the cursor keys on a remote control unit (e.g., 450R of FIGURE 4). The highlighting is illustrated by the dark box outlining the title in FIGURE 1. Normally, upon pressing the select key, the relevant programming data is transferred to a programming unit. Note also that an auxiliary text display 120 is shown. Auxiliary text display 120 provides additional data relating to the highlighted television program. A further use for the data provided by channel guide screen 110 and auxiliary text display 120 will be described below.

[0018] FIGURE 2 shows a "predictive agent list" or "viewed item list" which may be generated as a screen display 210. Data is automatically stored in this predictive agent list by the apparatus of the invention, whenever a program is watch for a given period of time, for example, 5 or more minutes. In this way, a record is kept of the user's viewing habits so that the apparatus can be guided to make a prediction of which upcoming shows may be of interest to the viewer.

[0019] A predictive agent list 210 is illustrated in FIGURE 2. In the example of FIGURE 2, the viewer has watched 7 movies, (the television program type "movies" is a broad classification known as a "topic"). The last movie was watched on 15 November 1995. Of these 7 movies there were three movies having the theme "comedy", and four movies having the theme "drama". The last comedy was watched on 15 November 1995, and the last drama was watched on 27 September 1995. The viewer also watched 21 episodes of a television program entitled "The Simpsons". Note that an indication of whether each item is locked or unlocked is also stored in the predictive agent list. A viewer may lock an item to prevent the system from automatically deleting that item, if that particular item has not been watched recently. Moreover, the user may edit the viewed item list in order to provide a better filter for the television programs to be predicted (see FIGURE 6c).

[0020] Automatic loading of the viewed item list is shown in the flowchart of FIGURE 3, wherein the routine is entered at step 300. At step 305, a check is made to see if the tuner has been tuned to the current channel for at least five minutes. If not, the routine is exited at step 310. If so, the routine advances to step 320 to get the viewed item list from memory. At step 325, a check is made to see if an item matching the currently viewed television program already exists in the viewed item list. If so, the count of that item is incremented and the routine is exited at step 335. If an item matching the currently viewed television program does not already exist in the viewed item list, then the routine advances to step 340. At step 340 a check is made to see if the list is full. If not, then data indicative of the currently viewed television program is added to the viewed item list, and the routine is exited at step 335. If, at step 340, it was determined that the viewed item list was full, then at step 350 the routine will read the least recently viewed item of the list. At step 355, a check will be made to see if that item is locked. If so, it means that the viewer does not want that item to be deleted, and the routine loops back to step 360 to get the next least recently viewed item from the list. That item will in turn be checked at step 355 to see if it is locked. If not, the routine will advance to step 365 where that item will be deleted to provide free space in the list. The routine will then advance to step 345, add the new item to the list, and exit at step 335.

[0021] A viewer may request a search to see "what's on" at any given time (see FIGURE 6a). The result of that search will be a list of predictions of television programs which the user might find interesting. Such a list of predictions will be displayed to the user by means of an on-screen display (see FIGURE 6b). The displayed list may be presented in a "weighted" fashion, for example in descending order of the number of times that a particular type of show was watched. Generation of this list of predictions is shown in the flowchart of FIGURE 5.

[0022] As noted above, the channel guide data used

by the controller of the subject apparatus to form the above-described interactive or confirmation sentences may be received from a satellite television communication system. FIGURE 4 shows such a satellite television communication system in which, a satellite 400S receives a signal representing audio, video, or data information from an earth-based transmitter 400T. The satellite amplifies and rebroadcasts this signal to a plurality of receivers 400R, located at the residences of consumers, via transponders operating at specified frequencies and having given bandwidths. Such a system includes an uplink transmitting portion (earth to satellite), an earth-orbiting satellite receiving and transmitting unit, and a downlink portion (satellite to earth) including a receiver located at the user's residence.

[0023] In a such a satellite system, the information necessary to select a given television program is not fixedly-programmed into each receiver but is rather is down-loaded from the satellite continually on each transponder. The television program selection information comprises a set of data known as a Master Program Guide (MPG), which relates television program titles, their start and end times, a virtual channel number to be displayed to the user, and information allocating virtual channels to transponder frequencies and to a position in the time-multiplexed data stream transmitted by a particular transponder. In such a system, it is not possible to tune any channel until the first master program guide is received from the satellite, because the receiver (IRD, or Integrated Receiver Decoder) literally does not know where any channel is located, in terms of frequency and position (i.e. data time slot) within the data stream of any transponder.

[0024] A master program guide is preferably transmitted on all transponders with the television program video and audio data, and is repeated periodically, for example, every 2 seconds. The master program guide, once received, is maintained in a memory unit in the receiver, and updated periodically, for example every 30 minutes. Retention of the master program guide allows instantaneous television program selection because the necessary selection data are always available. If the master program guide were to be discarded after using it to select a television program, then a delay of at least two seconds would be incurred while a new program guide was acquired, before any further television program selections could be performed.

[0025] Once the channel transponder carrying a desired television program is tuned, the data packets containing the audio and video information for that program can be selected from the data stream received from the transponder by examining the data packets for the proper SCID (Service Component Identifier) 12 bit code. If the SCID of the currently received data packet matches the SCID of the desired television program as listed in the program guide, then the data packet is routed to the proper data processing sections of the receiver. If the SCID of a particular packet does not match the SCID of

the desired television program as listed in the program guide, then that data packet is discarded.

[0026] A brief description of system hardware, suitable for implementing the above-described invention, now follows. In FIGURE 4, a transmitter 400T processes a data signal from a source 401 (e.g., a television signal source) and transmits it to a satellite 400S which receives and rebroadcasts the signal to a receiving antenna 400A which applies the signal to a receiver 400R. Transmitter 400T includes an encoder 410T, a modulator (i.e., modulator/forward error corrector (FEC)) 420T, and an uplink unit 430T. Encoder 410T compresses and encodes signals from source 401 according to a predetermined standard such as MPEG. MPEG is an international standard developed by the Moving Picture Expert Group of the International Standards Organization for coded representation of moving pictures and associated audio stored on digital storage medium. An encoded signal from unit 410T is supplied to modulator/Forward Error Corrector (FEC) 420T, which encodes the signal with error correction data, and Quaternary Phase Shift Key (QPSK) modulates the encoded signal onto a carrier.

[0027] Uplink unit 430T transmits the compressed and encoded signal to satellite 400S, which broadcasts the signal to a selected geographic reception area. The signal from satellite 400S is received by an antenna dish 400A coupled to an input of a so-called set-top receiver 400R (i.e., an interface device situated atop a television receiver). Receiver 400R includes a demodulator (demodulator/Forward Error Correction (FEC) decoder) 410R to demodulate the signal and to decode the error correction data, an IR receiver 412 for receiving IR remote control commands, a microprocessor 415R, which operates interactively with demodulator/FEC unit 410R, and a transport unit 420R to transport the signal to an appropriate decoder 430R within unit 400R depending on the content of the signal, i.e., audio or video information. An NTSC Encoder 440R encodes the decoded signal to a format suitable for use by signal processing circuits in a standard NTSC consumer VCR 402 and standard NTSC consumer television receiver 403. Microprocessor (or microcontroller, or microcomputer) 415R receives infrared (IR) control signals from remote control unit 450R, and sends control information to VCR 402 via an IR link 418R. Microprocessor 415R also generates the on-screen display (OSD) signals needed for presenting the interactive sentence, or confirmation sentence, to the user. Microprocessor 415R also receives and interprets cursor key X and Y information in order to control the highlighting of user choices in the on-screen displays.

[0028] The routine for automatic generation of the predictive list is set forth in FIGURE 5. The routine is entered at step 500, and at step 520, a search of the newly received program guide is performed for a match with search terms in the viewed item list of FIGURE 2. Note that the additional program descriptive data 120 of FIGURE 1 is also to be searched for a correspondence

with the search terms of FIGURE 2. The search routine loops at step 525 until completed. At step 530, the list is weighted for display. The list of items predicted to be of interest to the viewer is then displayed at step 535, and the program exited at step 540.

[0029] FIGURES 6a-6c show screen displays which enable the user to exercise the features of the invention. Specifically, FIGURE 6a is a Predictive Agent Main Menu screen accessed for example via the normal hierarchical menu system of the DSS® satellite television system. The screen display of FIGURE 6a has two "softkeys" labelled "Request a Suggestion" and "Edit User Information", respectively. Selecting "Request a Suggestion" causes a prediction operation to be performed, and brings up the screen display of FIGURE 6b. FIGURE 6b shows the predictions to the user, for example the movie Annie Hall on the Fox channel leads a list of shows predicted to be of interest to this particular viewer. The viewer may highlight one of the items on the list and then either tune to that show or record it. The other choice in the screen display of FIGURE 6a is "Edit User Information". Suppose the viewer had watched a show called (for purposes of this explanation) "Undesired Show". Further suppose that the viewer did not enjoy the show and does not want that show to influence future predictions. By selecting the "Edit User Information" softkey, the screen of FIGURE 6c is brought up for display. The viewer may then highlight the entry for "Undesired Show" and delete it by pressing the "Delete Item" softkey. As noted above, the viewer may also lock a desired entry to keep it from being automatically deleted when space is needed, if that item has a low count, or hasn't been watched recently.

[0030] Although the invention was described with reference to a satellite television system, it is equally applicable to ground based television broadcast systems, both digital and analog.

## 40 Claims

1. A method of selecting a television program comprising the steps of

searching a stored program guide for a television program matching data representing characteristics of television programs previously watched by a user;  
upon completion of said searching, notifying said user of an availability of a matched television program

characterized in that it comprises the step of:

storing automatically data representing characteristics of television programs previously watched by a user, said data being capable of

being manually changed in response to a user input.

2. The method of claim 1, wherein the data representing characteristics of television programs may relate to topic, title, date, theme, or frequency of watch information. 5
3. The method of claim 1, wherein the program guide comprises television program descriptive text which may relate to title, star, director or context of a television program, and said searching step including a search of said television program descriptive text. 10
4. The method of claim 1, further comprising the step of providing a user with the option of recording the matched program. 15
5. The method of claim 1, wherein the notifying step includes the step of producing a display of a list of television programs having similar characteristics to a previously watched television program. 20

#### Patentansprüche

1. Verfahren zur Wahl eines Fernsehprogramms mit folgenden Schritten:

Suche, in einem gespeicherten Programmführer, nach einem Fernsehprogramm, das Daten entspricht, die Kennwerte von Fernsehprogrammen darstellen, die in der Vergangenheit von einem Benutzer betrachtet wurden, Information des Benutzers über die Verfügbarkeit eines den Daten entsprechendem Fernsehprogramms nach Beendigung der Suche, 30

**gekennzeichnet durch** folgende Schritte:

automatisches Speichern der Daten, die Kennwerte von Fernsehprogrammen darstellen, die in der Vergangenheit **durch** einen Benutzer betrachtet wurden, wobei diese Daten aufgrund einer Benutzereingabe manuell geändert werden können. 35

2. Verfahren nach Anspruch 1, wobei die Daten, die Kennwerte der Fernsehprogramme darstellen, sich auf das Thema, den Titel, das Datum oder Informationen für die Häufigkeit der Betrachtung beziehen. 40
3. Verfahren nach Anspruch 1, wobei der Programmführer einen das Fernsehprogramm beschreibenden Text enthält, der sich auf den Titel, den Hauptdarsteller, den Regisseur oder den Kontext eines Fernsehprogramms beziehen kann, und der Suchvorgang in einer Suche des das Fernsehprogramm 45

beschreibenden Textes besteht.

4. Verfahren nach Anspruch 1 mit dem Schritt, daß einem Benutzer die Möglichkeit der Aufzeichnung des angepaßten Programms geliefert wird.
5. Verfahren nach Anspruch 1, wobei der Schritt der Information den Schritt der Erzeugung einer Wiedergabe einer Liste von Fernsehprogrammen enthält, die ähnliche Kennwerte wie in der Vergangenheit betrachtete Fernsehprogramme haben.

#### Revendications

1. Méthode de sélection d'une émission de télévision comprenant les étapes :

de recherche, dans un guide mémorisé des émissions, d'une émission de télévision correspondant à des données représentant des caractéristiques d'émissions précédemment regardées par un téléspectateur,

à l'issue de la recherche, de notification au téléspectateur de la présence d'une émission correspondant aux données,

**caractérisée en ce qu'elle comprend une étape de :**

stockage automatique des données correspondant aux caractéristiques d'émissions regardées précédemment par un téléspectateur; ces données pouvant être modifiées manuellement en réponse à une entrée par le téléspectateur.

2. Méthode de la revendication 1, dans laquelle les données correspondant aux caractéristiques d'émissions de télévision peuvent concerner le type, le titre, la date, le genre ou la fréquence de l'émission regardée.
3. Méthode de la revendication 1, dans laquelle le guide des émissions comprend une description des émissions de télévision qui peut concerner le type, les acteurs, le réalisateur ou le contexte d'une émission ; l'étape de recherche incluant une recherche de cette description des émissions.
4. Méthode de la revendication 1, comprenant, en outre, la possibilité pour l'utilisateur d'enregistrer l'émission répondant aux critères.
5. Méthode de la revendication 1, dans laquelle l'étape de notification comprend l'affichage d'une liste d'émissions de télévision dont les caractéristiques sont similaires à une émission regardée auparavant.

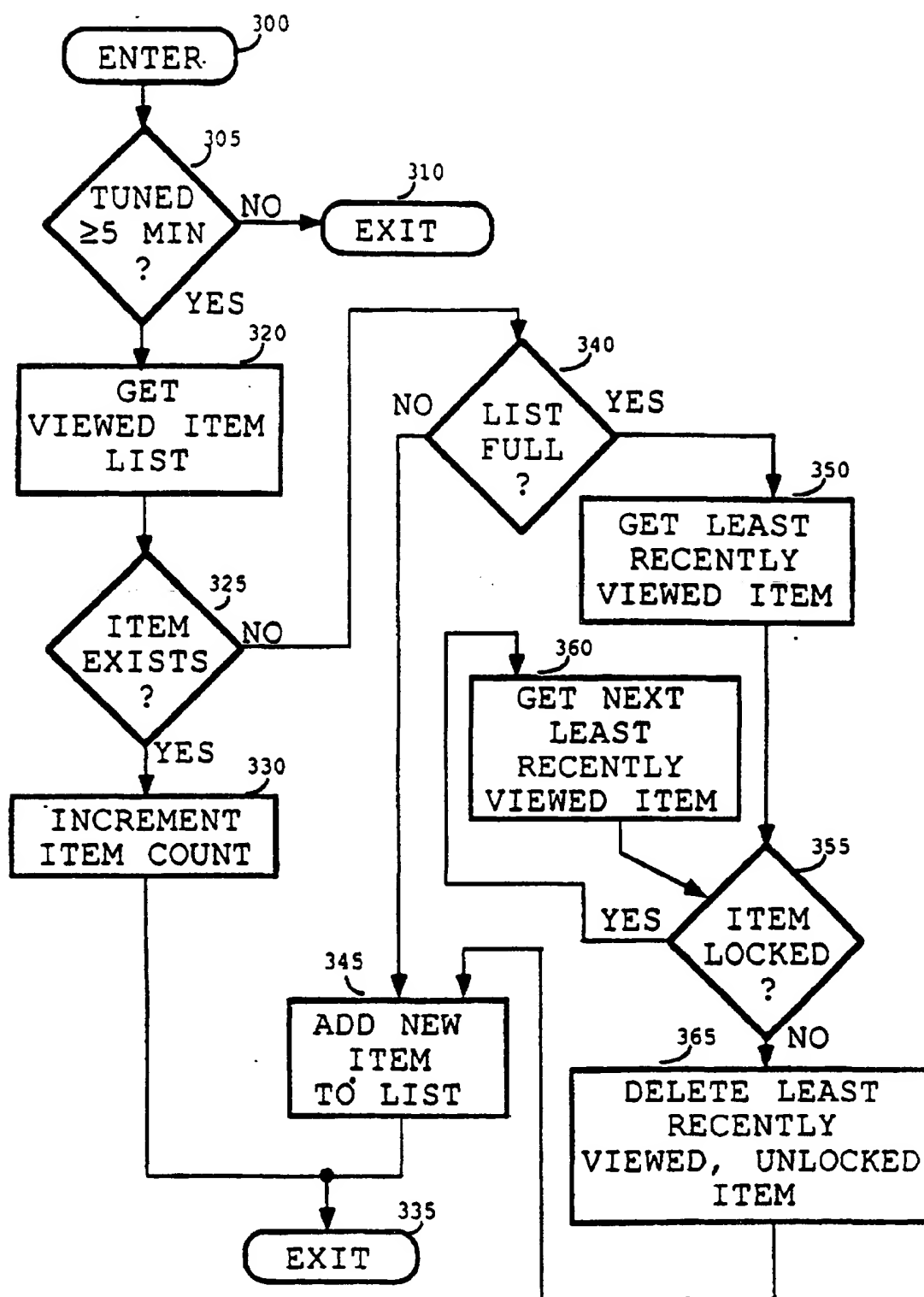
CH150		Program Guide		7:05pm
7:00pm		<div>110</div> <div>120</div> <div>           MOVIE TITLE: ZULU            STARRING: STANLEY BAKER &amp; MICHAEL CAINE            PRODUCER: STANLEY BAKER            RATING: PG-13 (VIOLENCE)            THEME: ACTION/ADVENTURE            REVIEW: ☆☆☆<math>\frac{1}{2}</math>            PLOT: A VASTLY OUTNUMBERED COMPANY OF BRITISH SOLDIERS IN LATE 19TH CENTURY SOUTH AFRICA DEFENDS AN ISOLATED OUTPOST AGAINST AN ATTACK BY 40,000 ZULU WARRIORS.         </div>		
HBO 102	OTHER PEOPLE'S MONEY			
CBS 106	EVENING NEWS			
UPN 113	STAR TREK: VOYAGER			
CINE 210	CINE SATURDAY NIGHT MOVIE: ZULU			
CNN 305	PRIME NEWS	BOTH SIDES	RELIABLE SOURCES	WORLD NEWS
USA 422	COUNTER STRIKE	QUANTUM LEAP		
MORE	MOVIES	SPORTS	OTHER	ALL EXIT

Fig. 1

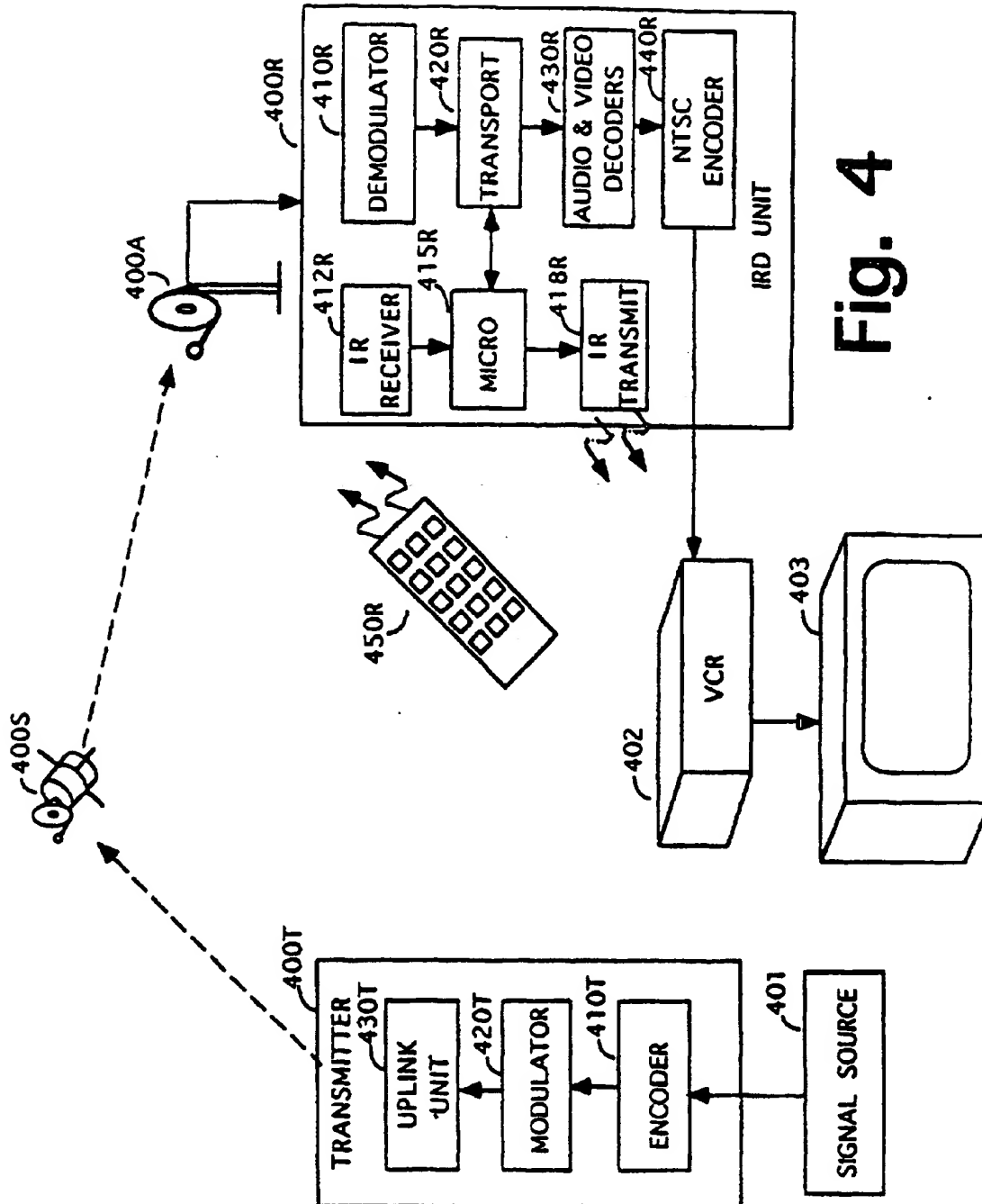
210

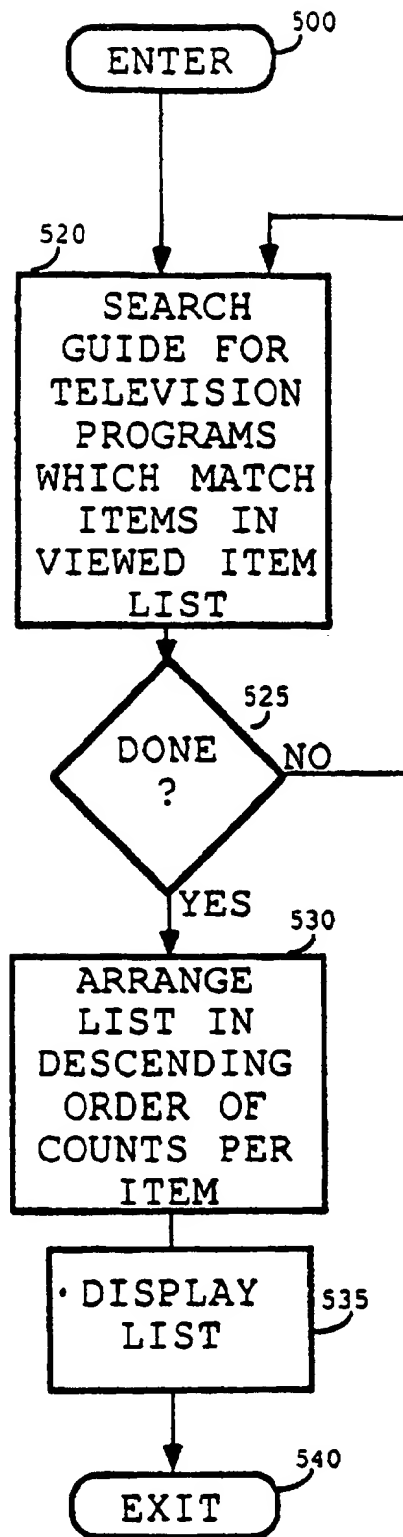
NAME	COUNT	TYPE	DATE	LOCK
movie	7	topic	11.15.95	no
comedy	3	theme	11.15.95	no
drama	4	theme	09.27.95	no
The Simpsons	21	title	10.23.95	yes

**Fig. 2**

**Fig. 3**





**Fig. 5**

Exit	Help
Request a Suggestion	
Edit User Information	

Fig. 6a

Exit	Help	Suggestions
Tune to Program		Annie Hall - Bravo
Record Program		The Simpsons - Fox
		X-Files - Fox
		Top Hat - AMC

Fig. 6b

Exit	Help	User Information
Delete Item		The Simpsons - 21 cnts
Lock Item		Movie/Comedy - 12 cnts
		X-Files - LOCKED - 2 cnts
		Movie/Drama - 10 cnts
		Undesired Show - 1 cnt

Fig. 6c

BEST AVAILABLE COPY